

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
1 April 2004 (01.04.2004)

PCT

(10) International Publication Number  
**WO 2004/026017 A3**

(51) International Patent Classification<sup>7</sup>: B21C 37/30

[US/US]; 19115 Prospect Ridge Lane, Houston, TX 77094  
(US). RING, Lev [US/US]; 14126 Heatherhill Place,  
Houston, TX 77077 (US).

(21) International Application Number:  
PCT/US2003/025742

(22) International Filing Date: 18 August 2003 (18.08.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
60/412,177 20 September 2002 (20.09.2002) US

(71) Applicant (for all designated States except US): ENVEN-  
TURE GLOBAL TECHNOLOGY [US/US]; 16200 A  
Park Row, Houston, TX 77084 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): SHUSTER, Mark

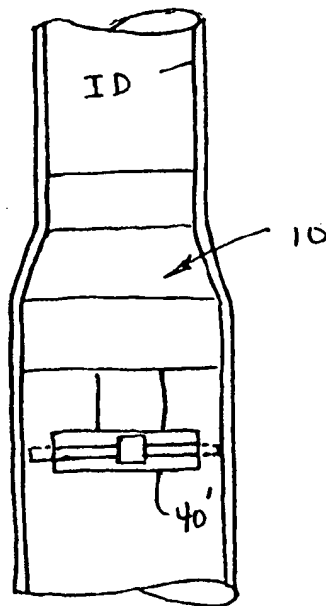
(74) Agents: MATTINGLY, Todd et al.; Haynes and Boone,  
LLP, 1000 Louisiana Street, Suite 4300, Houston, TX  
77002-5012 (US).

(81) Designated States (national): AE, AG, AL, AM, AT, AU,  
AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU,  
CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH,  
GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC,  
LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW,  
MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE,  
SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ,  
VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (regional): ARIPO patent (GH, GM,  
KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),  
Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),  
European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE,

[Continued on next page]

(54) Title: RESIDUAL STRESSES IN EXPANDABLE TUBULAR CASING



(57) Abstract: An elongated section of steel tubing (30) has an outer circumferential surface and an inner circumferential surface defining an elongated axial passage through the tubing. An expansion mandrel (10) is moved through the tubing for radially expanding the tubing. An impact member (40) is provided for travel through the length of the axial passage. A plurality of movable impactors (42) are mounted to extend from the impact member. The impactors are driven for repeated contact with the inner circumferential surface as the impact member is moved through the tubing subsequent to the expansion mandrel for contacting the expanded inner circumferential surface along the entire length of the axial passage. Movement of the impactors is ultrasonic.

WO 2004/026017 A3

BEST AVAILABLE COPY



ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO,  
SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM,  
GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

— *before the expiration of the time limit for amending the  
claims and to be republished in the event of receipt of  
amendments*

**Declaration under Rule 4.17:**

— *of inventorship (Rule 4.17(iv)) for US only*

(88) Date of publication of the international search report:  
15 July 2004

**Published:**

— *with international search report*

*For two-letter codes and other abbreviations, refer to the "Guid-  
ance Notes on Codes and Abbreviations" appearing at the begin-  
ning of each regular issue of the PCT Gazette.*

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/25742

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : B21C 37/30

US CL : 72/370.06

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 72/370.06, 370.08, 53, 75

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X — Y	US 2,929,741 A (STROCK et al.) 05 January 1960, (05-01-1960), whole doc.	23 15-19
X — Y	US 4,491,001 A (YOSHIDA et al.) 01 January 1985 (01-01-1985), whole doc.	1-3, 5-7, 21, 22 4, 8, 15-19
Y	US 6,343,495 B1 (CHEPPE et al.) 05 February 2002 (05-02-2002), whole doc.	4, 8

☐ Further documents are listed in the continuation of Box C.

☐ See patent family annex.

\* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

03 May 2004 (03.05.2004)

Name and mailing address of the ISA/US

Mail Stop PCT, Attn: ISA/US

Commissioner for Patents

P.O. Box 1450

Alexandria, Virginia 22313-1450

Facsimile No. (703) 305-3230

Date of mailing of the international search report

27 MAY 2004

Authorized officer

Lowell A Larson

Telephone No. 703 308-1148

*Sheila H. Vandy*  
Paralegal Specialist  
Tech. Center 3700

Form PCT/ISA/210 (second sheet) (July 1998)

BEST AVAILABLE COPY